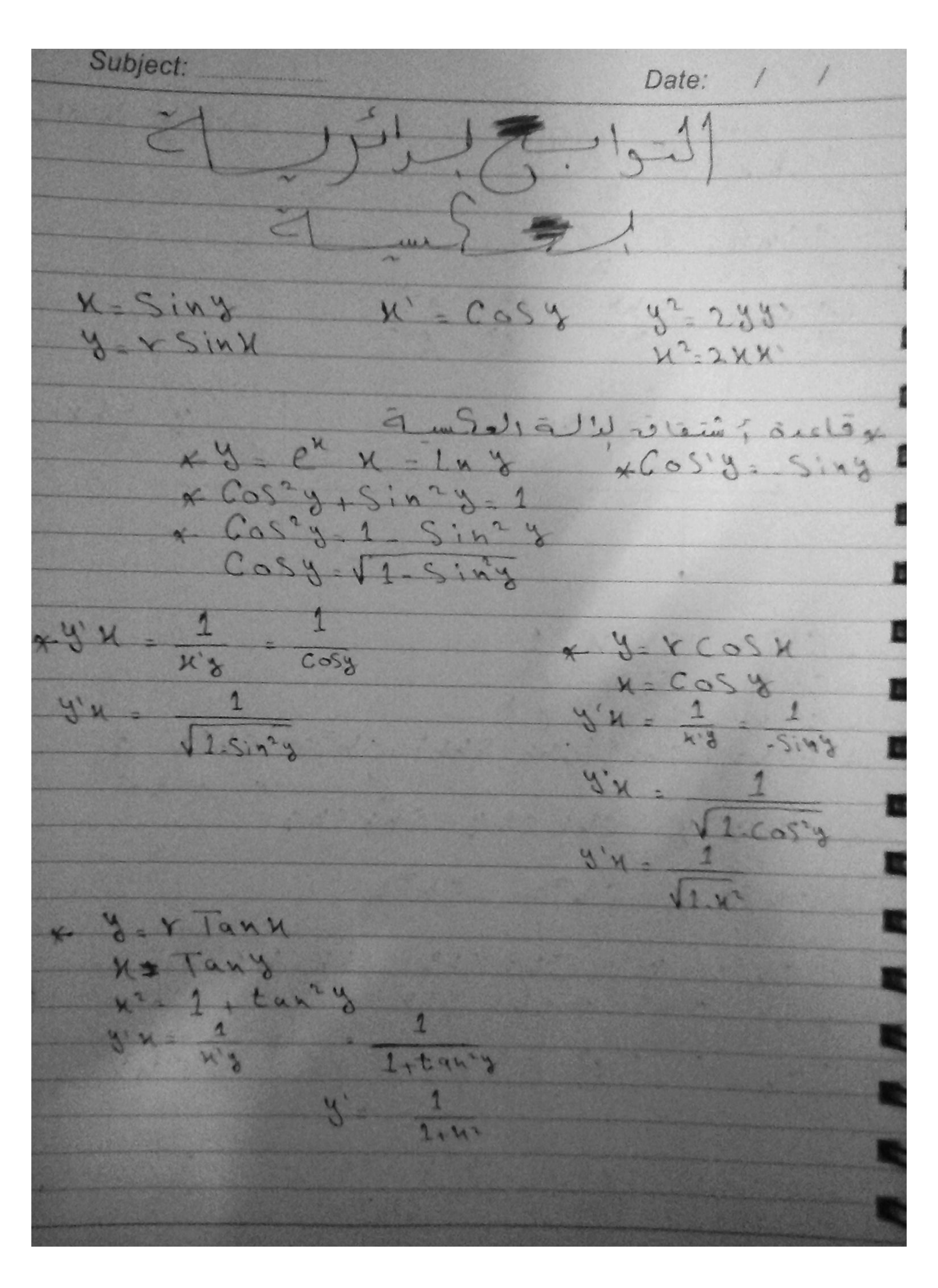


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التوابع الدائرية العكسية

$x = \sin y$ $x' = \cos y$ $y^2 = 2yy'$

$y = r\sin x$ $x^2 = 2xx'$

* قاعدة : اشتقاق الدالة العكسية

$* \ y = e^x \quad x = \ln y$ $* \ \cos' y = -\sin y$

$* \ \cos^2 y + \sin^2 y = 1$

$* \ \cos^2 y = 1 - \sin^2 y$

$\cos y = \sqrt{1 - \sin^2 y}$

$* \ y'x = \frac{1}{x'y} = \frac{1}{\cos y}$

$y'x = \frac{1}{\sqrt{1 - \sin^2 y}}$

$* \ y = r\cos x$

$x = \cos y$

$y'x = \frac{1}{x'y} = \frac{1}{-\sin y}$

$y'x = \frac{1}{\sqrt{1 - \cos^2 y}}$

$y'x = \frac{1}{\sqrt{1 - x^2}}$

$* \ y = r\tan x$

$x = \tan y$

$x' = 1 + \tan^2 y$

$y'x = \frac{1}{x'y} = \frac{1}{1 + \tan^2 y}$

$y' = \frac{1}{1 + x^2}$

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* التوابع القطعية

الجيب القطعي: $Sh\,x = \frac{e^{x} - e^{-x}}{2}$

التجيب القطعي: $Ch\,x = \frac{e^{x} + e^{-x}}{2}$

الظل القطعي: $Th\,x = \frac{Sh\,x}{Ch\,x} = \frac{e^{x} - e^{-x}}{e^{x} + e^{-x}}$

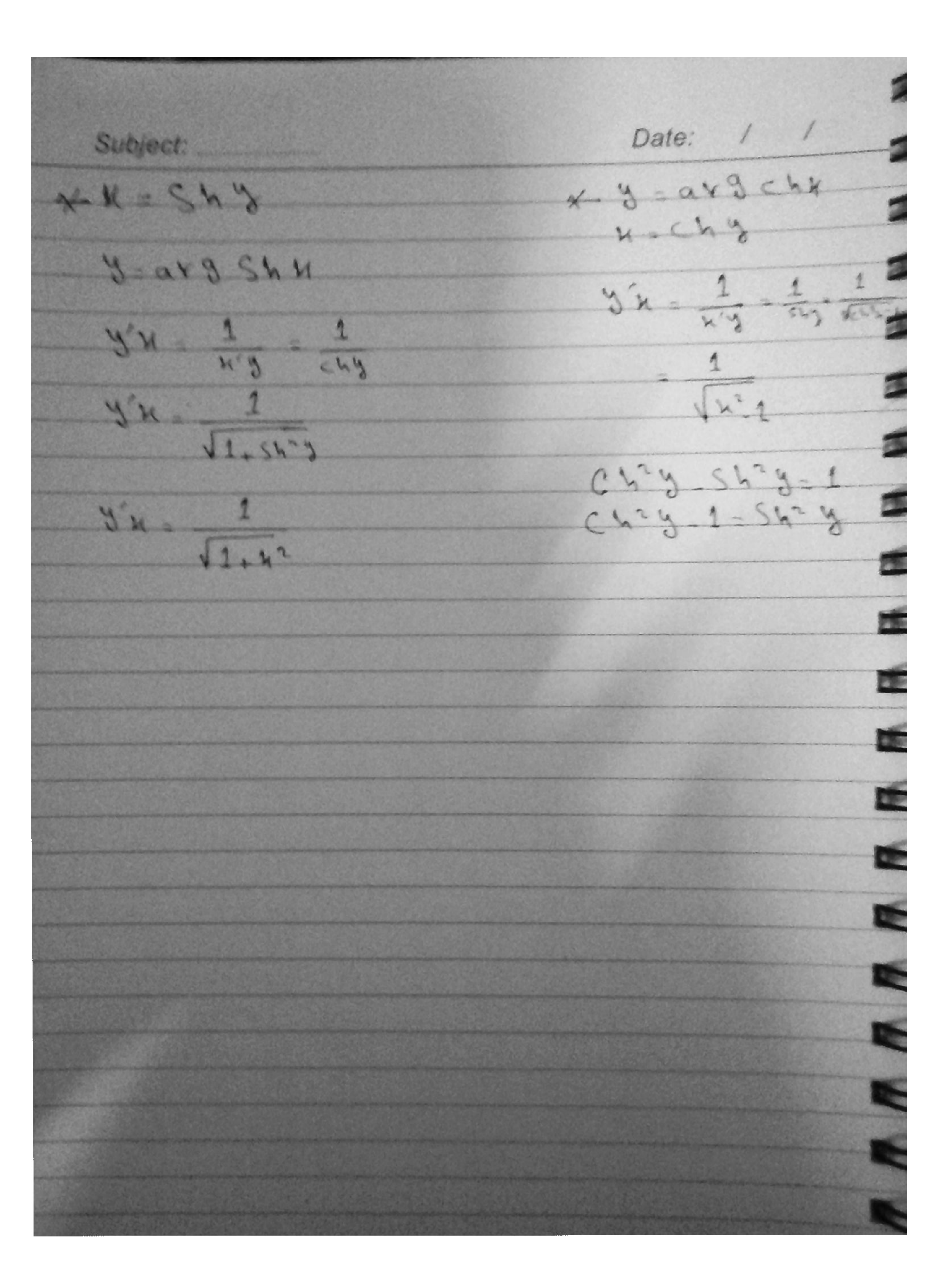
$y = Ch\,x$ $y = Sh\,x$

* $Ch^2x - Sh^2x = 1$
* $Ch\,x + Sh\,x = e^{x}$
* $Ch\,x - Sh\,x = e^{-x}$
* $(Ch\,x + Sh\,x)(Ch\,x - Sh\,x) = Ch^2x - Sh^2x = 1$

[illegible]

* $Ch(x+y) = Ch\,x\,Ch\,y + Sh\,x\,Sh\,y$
* $Ch(2x) = Ch^2x + Sh^2x$
* $Sh(x+y) = Ch\,x\,Sh\,y + Sh\,x\,Ch\,y$
* $Sh(2x) = 2\,Ch\,x\,Sh\,x$
* $(Ch\,x)' = \left(\frac{e^{x} - e^{-x}}{2}\right) = \frac{e^{x} + e^{-x}}{2} = Ch\,x$
* $(Th\,x)' = \frac{Sh\,x}{Ch\,x} = \frac{Ch^2x - Sh^2x}{Ch^2x} = \frac{1}{Ch^2x} = 1 - Th^2x$

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* $x = Sh\,y$

$y = \arg Sh\,x$

$y'x = \frac{1}{x'y} = \frac{1}{ch\,y}$

$y'x = \frac{1}{\sqrt{1 + sh^2 y}}$

$y'x = \frac{1}{\sqrt{1 + x^2}}$

* $y = \arg ch\,x$

$x = ch\,y$

$y'x = \frac{1}{x'y} = \frac{1}{sh\,y} = \frac{1}{\sqrt{ch^2 y - 1}}$

$= \frac{1}{\sqrt{x^2 - 1}}$

$Ch^2 y - Sh^2 y = 1$

$Ch^2 y - 1 = Sh^2 y$